

reported on not more than one day in any 5-degree square between the fifteenth and forty-fifth meridians. Fog was reported on from 2 to 3 days between the French coast and fifteenth meridian; on from 3 to 6 days over the Grand Banks; on 10 days along the American coast between New York and Hatteras, while it was unusually prevalent in the Gulf of Mexico, where it was observed on from 4 to 8 days.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, 8 a. m. (seventy-fifth meridian). North Atlantic Ocean, December, 1929

Stations	Average pressure	Departure	Highest	Date	Lowest	Date
	<i>Inches</i>	<i>Inch</i>	<i>Inches</i>		<i>Inches</i>	
Julianeab, Greenland.....	29.25	(1)	29.88	30th.....	28.50	1st.
Belle Isle, Newfoundland.....	29.74	<sup>2</sup> +0.04	30.34	20th.....	29.02	25th.
Halifax, Nova Scotia.....	29.99	<sup>3</sup> +0.04	30.62	13th.....	28.68	30th.
Nantucket.....	30.03	<sup>3</sup> +0.01	30.42	23d.....	29.54	31st.
Hatteras.....	30.12	<sup>3</sup> 0.00	30.44	1st.....	29.62	19th.
Key West.....	30.10	<sup>3</sup> +0.01	30.30	21st.....	29.85	18th.
New Orleans.....	30.22	<sup>3</sup> +0.07	30.48	4th.....	29.66	18th.
Cape Gracias, Nicaragua.....	29.92	<sup>2</sup> -0.06	29.98	26th.....	29.84	18th.
Turks Island.....	30.12	<sup>3</sup> +0.09	30.20	21st.....	29.92	26th.
Bermuda.....	30.21	<sup>3</sup> +0.09	30.44	13th.....	29.92	4th. <sup>4</sup>
Horta, Azores.....	30.22	<sup>3</sup> +0.11	30.66	31st.....	29.80	4th.
Lerwick, Shetland Islands.....	29.28	<sup>2</sup> -0.44	30.45	17th.....	28.26	29th.
Valencia, Ireland.....	29.52	<sup>2</sup> -0.42	30.69	16th.....	28.41	5th.
London.....	29.72	<sup>2</sup> -0.30	30.72	17th.....	28.99	5th.

<sup>1</sup> No normal available.

<sup>2</sup> From normals shown on Hydrographic Office Pilot Chart, based on observations at Greenwich mean noon, or 7 a. m., seventy-fifth meridian time.

<sup>3</sup> From normals based on 8 a. m. observations.

<sup>4</sup> And on other date or dates.

On the 7th the conditions over the steamer lanes did not differ materially from those of the 6th as shown on Chart XIII, as winds of hurricane force accompanied by hail and snow prevailed between the twentieth and fortieth meridians. On the 8th the storm area extended from the thirtieth meridian to the British coast, while by the 9th and 10th, it had contracted somewhat in extent, although heavy weather continued along the coast until the 12th. On the 13th, with the exception of a few reports of winds of force 7 from land stations on the

British Isles, moderate weather was the rule over the ocean as a whole.

On the 14th southerly winds of force 7 to 10 were reported between the fortieth parallel and Cape Sable, while over the remainder of the ocean moderate conditions prevailed and continued through the 17th.

On the 18th a low moderate in intensity and extent was central near 50° N., 33° W. This was evidently a forerunner of the series of disturbances that continued over different sections of the steamer lanes until near the end of the month, the storm area varying considerably in extent from day to day.

On the 19th a norther prevailed over the western sections of the Gulf of Mexico and the station at Vera Cruz reported at the morning observation, wind NNW., 10, barometer 30.10 inches, maximum velocity of wind 76 miles an hour.

From the 19th to 21st most of the heavy weather was confined to the eastern section of the ocean, although on the 20th a southwest wind, force 9, was reported by a vessel near Hatteras. From the 22d to 25th, however, westerly to northwesterly gales covered the major part of the steamer lanes, the storm area reaching its greatest dimension on the 25th, when it extended from the sixtieth meridian to the coast of Europe, north of the fortieth parallel. On the 26th and 27th the force of the wind as well as the area covered had diminished somewhat, the latter then extending from the thirty-fifth to fiftieth parallels and twentieth to fiftieth meridians, while on the 26th winds of force 10 were also reported between the Bermudas and Nantucket.

On the 28th and 29th the region between the thirtieth meridian and the coast of Europe was swept by southwesterly to westerly gales, the weather being especially severe on the coast on the latter day. On the 30th heavy weather continued off the coast of France and there was also a disturbance between the Bermudas and Nova Scotia, one vessel about 150 miles south of Sable Island reporting a southwesterly wind, force 12.

#### OCEAN GALES AND STORMS, DECEMBER, 1929

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN													
Kerhonkson, Am. S. S.	New York	Glasgow	55 00 N.	21 00 W.	Nov. 30.	7 p. Dec. 1.	Dec. 3.	27.83	W	WSW., 11.	SW	WSW., 11.	SSE-S-SSW.
Winnebago, Br. S. S.	do.	Avonmouth	47 09 N.	32 50 W.	Dec. 1.	10 p., 2.	3	28.89	NNW	NW., 10.	NW	—, 10.	W-NW.
West Hobomac, Am. S. S.	New Orleans	Glasgow	51 30 N.	8 35 W.	2	4 a., 2.	2	29.00	WSW	SW, 11.	W	SW, 11.	SSW-W.
San Macedonio, Br. S. S.	Tampico	Rio de Janeiro.	22 21 N.	93 50 W.	2	Noon, 2.	3	29.95	NW	N., 7.	N	N., 9.	Steady.
Hoxie, Am. S. S.	New York	Glasgow	45 35 N.	40 00 W.	2	6 p.	3	28.64	NNW	SW., 11.	NW	SW., 12.	WSW-W-NW.
Manchester Spinner, Br. S. S.	Halifax	Liverpool	51 14 N.	25 16 W.	4	Noon, 4.	5	(1)	SSW	WSW., 11.	WNW	WSW., 11.	WSW-W-NW.
Westpool, Am. S. S.	Bremen	Boston	51 30 N.	16 01 W.	4	—, 4.	11	27.46	SSE	WNW, 12.	SW	—, 12.	NW-SW.
Reliance, Ger. S. S.	Hamburg	New York	49 54 N.	29 30 W.	4	8 a., 4.	7	27.81	NW	WSW, 11.	W	—, 12.	WSW-NW.
West Eldara, Am. S. S.	New York	Antwerp	48 58 N.	25 44 W.	1	9 a., 4.	5	27.85	WNW	W., 12.	WNW	—, 12.	—
Baltic, Br. S. S.	Liverpool	New York	49 37 N.	28 24 W.	—	8 a., 4.	7	27.74	NW	—	NNW	—, 12.	SW-NW.
Middleham Castle, Br. S. S.	Galveston	Havre	47 15 N.	14 52 W.	4	4 a., 5.	5	28.88	SSW	SSW., 8.	SW	SSW., 10.	SSW-SW.
France, Fr. S. S.	Havre	New York	49 50 N.	15 16 W.	6	Noon, 6.	7	28.21	WNW	WNW, 12.	WSW	WNW, 12.	steady.
Henri Jasper, Belg. S. S.	New York	Antwerp	49 10 N.	31 00 W.	6	Noon, 7.	8	29.19	WSW	WNW, 12.	WNW	WNW, 12.	—
Moerdijk, Du. S. S.	London	Curacao	49 16 N.	4 55 W.	8	—, 8.	10	29.31	SW	—, 9.	NW	—, 11.	—
West Gambo, Am. S. S.	New Orleans	Bremen	49 00 N.	8 30 W.	10	9 a., 10.	13	29.63	SW	SW, 7.	WNW	W., 12.	—
Grete, Ger. S. S.	Hamburg	Tampa	46 00 N.	16 00 W.	20	1 p., 21.	24	29.17	SW	WNW, 10.	WNW	WNW, 11.	—
Natira, Am. S. S.	Boston	Hamburg	43 48 N.	45 00 W.	22	11 a., 22.	25	29.15	NW	—, 8.	NW	—, 9.	—
Schoharie, Am. S. S.	Savannah	Liverpool	46 03 N.	40 13 W.	23	—, 23.	24	29.18	NW	NW., 10.	NW	—, 10.	Steady.
River Delaware, Br. S. S.	New York	Gibraltar	39 48 N.	54 50 W.	24	3 p., 24.	25	29.64	SW	SW, 7.	NW	SW., 10.	S-SW-NW.
Topa Topa, Am. S. S.	Wilmington, N. C.	Liverpool	51 00 N.	17 00 W.	21	—, 24.	25	27.69	W	NW., —	NW	—, 11.	E-SE-NW.
Hoxie, Am. S. S.	Avonmouth	Baltimore	46 20 N.	20 35 W.	20	7 a., 24.	29	28.66	WSW	WNW, 10.	N	WNW, 12.	S-WNW-NW.
Boston City, Br. S. S.	Fowey	Boston	49 48 N.	19 15 W.	24	11 a., 24.	25	28.03	SE	NW., 12.	NW	NW., 12.	SE-S-NW.
Jobshaven, Du. S. S.	Rotterdam	New York	41 13 N.	49 20 W.	22	9 a., 25.	25	29.59	NW	SW, 11.	SW	SW., 11.	SW-W.
West Tacomac, Am. S. S.	Houston	Havre	37 48 N.	65 59 W.	26	—, 26.	26	29.48	ESE	ESE., 3.	NW	—, 10.	ESE-NNE.
Florida, Dan. S. S.	Newcastle	Portland, Me.	52 00 N.	36 20 W.	24	2 a., 26.	26	27.92	N	NW., 11.	NNW	NW., 11.	SW-NW.

<sup>1</sup> Observer states that at 10.17 a. m., Dec. 4, barometer was below lowest graduation, the hand resting against the thermometer attached to dial. At 1 p. m., Dec. 6, the barometer read 28 inches.

## Ocean gales and storms, December, 1929—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN—Continued													
Sneaton, Br. S. S.	St. Vincent	Cork	22 20 N.	22 56 W.	26	6 p, 26	28	29.96	NE	FSE, 6	E	E, 9	NE-ESE.
Milwaukee, Ger. S. S.	Southampton	New York	45 52 N.	41 20 W.	27	9 a, 27	27	29.16	SE	NE, 12	WNW	NE, 12	
Dosina, Du. S. S.	Rotterdam	Curacao	46 30 N.	46 30 W.	28	7 p, 28	29	29.46	WSW	SW, 10	W	W, 12	WSW-W.
Lubrafol, Belg. S. S.	Amsterdam	Galveston	45 23 N.	17 18 W.	28	2 p, 28	28	29.33	SW	SW, 10	NW	W, 11	SW-W-NW.
Asia, Dan. M. S.	Rotterdam	Alexandria	49 00 N.	4 20 W.	28	4 a, 29	30	29.26	SW	WSW, 10	NW	—, 12	WSW-W.
Milwaukee, Ger. S. S.	Southampton	New York	42 00 N.	60 10 W.	29	8 a, 30	30	29.07	SE	WSW, 11	WNW	—, 12	WSW-W-WNW.
NORTH PACIFIC OCEAN													
Siberia Maru, Jap. S. S.	Yokohama	Victoria	45 50 N.	163 30 E.	1	4 a, 4	4	29.41	NNE	NNW, 8	NNW	NNW, 9	Steady.
Charles H. Cramp, Am. S. S.	Balboa	San Diego	12 54 N.	90 46 W.	2	Noon, 2	3	29.90	N	N, 7	NW	NNW, 8	Steady.
Manoa, Am. S. S.	San Francisco	Honolulu	26 12 N.	149 26 W.	2	11 a, 2	3	29.69	W	NNW, 7	N	NNW, 8	W-NNW.
Pres. Van Buren, Am. S. S.	Honolulu	Kobe	33 50 N.	149 34 E.	3	2 a, 3	3	29.62	NE	NNE	NNE	NNW, 10	Steady.
Erviken, Nor. S. S.	Hong Kong	San Francisco	26 31 N.	120 05 E.	3	4 a, 3	4	30.06	NE	N, 6	NE	NE, 8	N-NE.
William Penn, Am. M. S.	San Pedro	Balboa	14 25 N.	95 23 W.	3	4 p, 3	4	29.87	NNE	NNW, 10	NNW	NNE, 10	NNE-NNW.
Akagisan Maru, Jap. M. S.	Portland	Yokohama	54 24 N.	175 00 W.	3	4 a, 4	4	29.43	SSE	SSE, 9	WNW	SSE, 11	SSE-WNW.
Tsuyama Maru, Jap. S. S.	Yokohama	San Francisco	40 17 N.	151 34 W.	3	Mdt., 4	6	29.35	NNE	SE, 9	SE	SE, 9	SE-S.
Athelmere, Br. S. S.	San Pedro	Yokohama	33 55 N.	174 50 E.	4	4 a, 5	5	29.86	SSE	SW, —	WNW	SSE, 12	
Tejon, Am. S. S.	do	Balboa	15 35 N.	96 20 W.	4	7 p, 4	5	29.95	E	E, 7	NW	N, 8	
Tabchee, Br. S. S.	do	Shanghai	32 54 N.	153 16 W.	5	4 a, 5	6	29.54	WSW	WSW, 7	WSW	W, 10	WSW-W.
Pennsylvania, Am. S. S.	Columbia River	Yokohama	42 36 N.	154 17 E.	5	Noon, 5	6	29.16	ESE	NW, 9	NNW	NW, 10	S-NW.
Olympia, Am. S. S.	Otaru	San Francisco	44 00 N.	155 00 W.	5	10 a, 5	6	29.76	NE	NE, —	NE	NE, 9	ENE-NE.
Do	do	do	44 00 N.	146 00 W.	8	6 a, 8	9	29.36	NE	NE, —	NNW	NE, 9	NE-N.
Pres. Madison, Am. S. S.	Seattle	Yokohama	49 28 N.	176 15 E.	5	9 p, 6	10	29.23	SSW	ESE, 2	WNW	NW, 10	ESE-NW.
Oregon, Am. S. S.	Portland	Shanghai	50 39 N.	137 52 W.	9	11 a, 9	11	29.67	NNE	NNE, 9	NNE	NNE, 9	
Admiral Peoples, Am. S. S.	San Francisco	Portland	41 21 N.	124 36 W.	13	2 p, 13	14	29.79	SE	SE, 8	SSW	SE, 8	
Pennsylvanian, Am. S. S.	New York	Los Angeles	14 30 N.	95 32 W.	19	2 p, 19	19	29.81	N	NNE, 9	NNE	NNE, 10	N-NNE.
Atlanta City, Am. S. S.	Honolulu	Yokohama	21 45 N.	161 35 W.	14	4 p, 14	17	29.76	S	S, 6	NNW	NW, 9	S-SSW.
Oregon, Am. S. S.	Portland	Shanghai	49 55 N.	172 45 E.	20	—, 20	21	29.57	ESE	ESE, 7	W	W, 11	
Pres. Grant, Am. S. S.	Yokohama	Victoria	40 07 N.	150 55 E.	21	10 a, 21	21	28.62	E	NNW, 9	NW	NNW, 12	SW-NNW.
Do	do	do	46 22 N.	168 48 E.	23	8 p, 23	24	29.27	SSE	SW, 8	W	—, 10	SSE-W.
Emp. of Prussia, Br. S. S.	Victoria	Honolulu	46 09 N.	129 25 W.	22	Noon, 22	22	29.67	SW	SW, 8	W	SW, 8	SW-W.
Erviken, Nor. S. S.	San Francisco	San Francisco	45 55 N.	166 50 W.	21	—, 21	21	29.19	WSW	WSW, 2	W	WNW, 10	WSW-W.
Diana Dollar, Am. S. S.	Yokohama	San Pedro	51 53 N.	150 32 W.	22	12 p, 22	23	29.42	SSE	SW, 9	W	SW, 9	SSE-SSW.
Atlanta Sun, Am. S. S.	Philadelphia	do	13 45 N.	94 03 W.	23	Noon, 23	24	29.99	N	N, —	NNW	N, 10	N-NNE.
Pres. Jackson, Am. S. S.	Victoria	Yokohama	39 58 N.	147 41 E.	25	Noon, 25	26	29.57	W	WNW, 8	WNW	NW, 10	
Oregon, Am. S. S.	Portland	Shanghai	44 58 N.	152 30 E.	25	9 p, 25	26	28.96	NW	N, 12	NW	N, 12	NW-N.
Siberia Maru, Jap. S. S.	Yokohama	Yokohama	51 53 N.	150 32 W.	24	8 p, 27	28	29.24	SE	SW, 7	W	SSW, 10	SSW-WSW.
Havre Maru, Jap. S. S.	Coos Bay	Coos Bay	49 17 N.	144 39 W.	26	4 a, 27	27	29.50	S	SW, 10	SSW	SW, 10	S-SW.
Carlier, Belg. S. S.	Muroran	Vancouver	41 24 N.	154 16 E.	26	—, 26	27	29.50	NW	NW, 8	NW	NW, 9	3 pts.
Oregon, Am. S. S.	Portland	Shanghai	42 55 N.	148 06 E.	27	2 p, 27	27	29.53	W	W, 10	WNW	W, 10	W-NW.
Atlantic City, Am. S. S.	Honolulu	Yokohama	33 00 N.	142 00 E.	27	4 a, 28	29	29.99	SW	SW, 6	NW	NE, 10	S-SW-NW.
Pres. McKinley, Am. S. S.	Victoria	do	50 20 N.	131 50 W.	29	Mdt., 29	30	29.44	SSW	SW, 10	W	SW, 10	SSW-W.
J. A. Moffett, Am. S. S.	La Union	San Pedro	15 45 N.	95 00 W.	28	4 a, 29	29	29.94	NNW	NW, 8	NNE	NW, 8	S-N.
Wilhelmina, Am. S. S.	Portland	Honolulu	29 40 N.	148 40 W.	28	4 p, 31	31	29.82	S	S, 4	SE	ENE, 9	
Nevada, Am. S. S.	Manila	San Francisco	34 50 N.	159 45 E.	31	11 p, 31	Jan. 1	29.28	SSE	SSE, 9	NNW	SSW, 10	
SOUTH PACIFIC OCEAN													
Canadian Leader, Br. S. S.	Sydney	Panama	34 19 S.	154 17 W.	15	5 a, 16	Dec. 15	28.98	N	S, 9	WSW	N, 9	N-W-S.
SOUTH ATLANTIC OCEAN													
Capillo, Am. S. S.	Montevideo	Jacksonville	16 25 S.	36 45 W.	2	10 a, 2	2	29.83	SE	SE, 9	—	SE, 9	SE-SW.
Gustav Schindler, Ger. S. S.	Durban	Dakar	35 10 S.	20 26 E.	2	8 p, 2	3	29.54	WSW	WSW, 8	W	W, 10	WSW-NW.

551.506 (265.2)

NORTH PACIFIC OCEAN<sup>1</sup>

By WILLIS E. HURD

During the greater part of the early half of December, 1929, high atmospheric pressure overlay most of the Aleutian region, and it was not until well into the latter half of the month that deep cyclonic conditions prevailed over northeastern waters—28.76 inches at Dutch Harbor on the 27th and 28.82 at Kodiak on the 28th being the minimum readings at land stations. The average for the month showed a shallow depression of 29.75 inches ex-

<sup>1</sup> Cf. Bowie, E. H. The long dry season of 1929 in the Far West Mo. Wea. Rev. 57: 449-451.—Editor.

tending westward from Kodiak to the central Aleutians, at least, and covering the eastern part of the Bering Sea.

Cyclonic conditions prevailed in central latitudes from the 8th to the 17th, after which dates the California-Pacific anticyclone gradually spread out and influenced the weather along a goodly portion of the middle steamship routes. In the waters of the Far East south of the latitude of Japan, strong and extensive high-pressure areas alternated frequently with shallow lows from China.

Barometric data for several island and coast stations in west longitudes, including Point Barrow on the Arctic Ocean, are given in the following table: